

Integrating Mathematics and Quality Teaching

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Project Title	Integrating Mathematics and Quality Teaching in Isolated Schools Through Technology
Project Team	Dr Chris Reading, Ms Rachael Adlington (SiMERR National Centre)
Period	2007 - 2008
Funding Agency	Australian Schools Innovations in Science, Technology and Mathematics (ASISTM – Round 3)
Organisational Base	SiMERR National Centre

Description

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SiMERR National Centre, a partner organization to an ASISTM project, was asked to perform an evaluation of the outcomes of the project. This project aimed to enhance student-learning outcomes in mathematics through engaging students in rich, authentic learning experiences incorporating electronic 'learning objects'.

Eleven cluster schools (primary, central and high) collaboratively explored the potential and challenges of current and emergent technologies to provide enhanced student learning outcomes in mathematics through engagement in rich and authentic learning experiences including 'learning objects'. Key activities included a technology camp that all schools and students participated in, video-conferencing for inter-school activities, and a visit by the DET Learning Objects Project Officer to participating schools. The Project Officer demonstrated the connection between concrete real life mathematics tasks and technology including learning objects, computers and smart boards. Innovative elements of the project included the piloting of new software to enhance the teaching of mathematics, video-conferencing and the benchmarking of learning outcomes conducted by external parties before and after the pilot implementation.

To provide the evaluation, SiMERR addressed the research question: What is the impact of technology on the mathematics classroom? To inform this, two sub-questions were investigated: 'how is teacher practice changing as a consequence of using technology in mathematics teaching?', and, 'how is student learning changing as a consequence of using technology in mathematics teaching?' For the evaluation, teachers at each school were interviewed to determine the impact of technology using the Quality Teaching Framework (QTF) dimensions of intellectual quality, quality learning environment and significance of their teaching practice, and to determine the indicators of motivation, engagement and improved learning outcomes in their students' learning.

Participants

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11 in-service teachers; one from each participating school

Findings

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As the project progressed teachers began to rethink their practice, supported by the online professional learning community that was formed. The opportunity to be exposed to new technologies and their use in enhancing mathematics learning inspired teachers to try new ideas in their classrooms. The project did not just provide information about the technologies but allowed the teachers to trial the use of technology with their students in a supported environment. Teachers tried things they may not have tried without this support. Although interactive whiteboards, learning objects and videoconferencing were the focus of the project, some teachers also adopted other technologies that were only touched on in the project activities, such as animations. As well as using new technologies with their teaching, teachers reported that they had better ways of supporting learning with technologies than they had already been using before the project.

Teachers reported setting greater expectations of their students when technology was being used. They also found that students were not only meeting these higher expectations but were meeting them more quickly than anticipated. There was also change in student attitude. Students interacted more productively with their peers; sharing work, talking about their work and supporting each other. The raised expectations that teachers had of the students led to increased student confidence and students investigating alternate ways of completing tasks. There was more risk-taking in the learning environment by both the teachers and the students, with teachers exploring a greater range of options for students to demonstrate their new-found mathematical knowledge.

Students experienced enhanced levels of engagement during technology-related mathematical activities. This was evident from a vast range of indicators identified by the teachers. As students became more proficient with the technology they engaged more with the mathematical content of the activities. Many aspects of using technology motivated the students and students experienced greater social support, both within and across schools, when undertaking the project activities. This was especially important for the students from the small schools but will only be sustainable if these schools continue to

engage in cross-school activities.

Outcomes

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- Reading, C. & Adlington, R. (2008). Integrating Mathematics and Quality Teaching in Isolated Schools Through Technology. (Evaluation included in the final ASISTM project report). Armidale, NSW: UNE, SiMERR – National Centre.

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It is clear that using technology enhances mathematics teaching and learning in isolated schools. It was also apparent that this collaborative and unique professional learning opportunity facilitated changes that may not have otherwise occurred. Teachers reported positive changes in teaching practice, and student engagement and motivation, resulting in better student attainment of learning outcomes. It is anticipated that the teachers will continue to use and further explore the use of technology to enhance mathematics in the classroom.

This project has been a worthwhile and productive experience for both students and teachers, but teachers did identify that there was the potential for more to be done. Teachers should be encouraged to continue to take advantage of professional learning opportunities, especially in collaborative projects, which allow them to further advance their skills in using technology with teaching, particularly in mathematics. Teachers should also engage in further professional learning to help them deconstruct the Quality Teaching Framework elements in the context of technology-rich mathematical learning environments, as the project revealed that many of the teachers did not have a deep understanding of the Quality Teaching Framework elements in the three dimensions.

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